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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,172	08/24/2001	Trishul M. Chilimbi	50037.59US01	4159
27488	7590	06/02/2004	EXAMINER	
MERCHANT & GOULD P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			NGUYEN BA, HOANG VU A	
			ART UNIT	PAPER NUMBER
			2122	

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/939,172	<b>Applicant(s)</b> CHILIMBI, TRISHUL M.	
	<b>Examiner</b> Hoang-Vu A Nguyen-Ba	<b>Art Unit</b> 2122	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/23/02</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This action is responsive to the application filed August 24, 2001.
2. Claims 1-22 have been examined.

### *Drawings*

3. The drawings are objected to because of the following informalities:
  - a. Figure 6, block 635: the terms "Identifier" and "Identifying" are mistyped;
  - b. Figure 8, block 835: the term "HDS" is not spelled out the first time it is used. For examination purposes, the term HDS is interpreted to mean Hot Data Stream;
  - c. Figure 11, block 1130: it is unclear what the identifier "IN" (end of first line) stands for.

Correction is required.

### *Specification*

4. The title of the invention is not descriptive because it is unclear what is the meaning of the term "Daedalus". A new title is required that is clearly indicative of the invention to which the claims are directed.

### *Claim Objections*

5. Claims 7 and 10 are objected to because of the following informalities:  
In these claims the conjunction – and – should be added to the end of the limitation that precedes the last limitation of the claim.

Appropriate correction is required.

*Claim Rejections - 35 USC § 112*

6. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 10 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 is ambiguous. A single claim which claims both a computer-readable medium having computer-executable instructions for improving data accesses for a computer program and the method steps of receiving, identifying data access information, and updating a data structure as claimed is indefinite under 35 U.S.C. 112, second paragraph. In *Ex parte Lyell*, 17 USPQ 2d 1548 (Bd. Pat. App. & Inter. 1990), a claim directed to an automatic transmission workstand and the method steps of using it was held to be ambiguous and properly rejected under 35 U.S.C. 112, second paragraph.

In claim 10, it is unclear whether a computer-readable medium or computer-executable instructions or a computer program or a process is claimed. With a computer-readable medium recited in the preamble, one would expect to find in the body of the claim means or devices having functions to receive, identify data access information and update a data structure. However, one only found method steps for improving data accesses for a computer program.

Correction is required.

*Claim Rejections – 35 USC § 101*

8. 35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claim 10 is rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

A single claim which claims both a computer-readable medium and the method steps of using the computer-readable medium should also be rejected under 35 U.S.C. 101, *Ex parte Lyell*, 17 USPQ 2d 1548 (Bd. Pat. App. & Inter. 1990), based on the theory that the claim is directed to neither a “process” nor a “machine,” but rather embraces or overlaps two different statutory classes of invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only. *Id.* at 1551.

Correction is required.

10. Claims 17-20 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

While the claims are in the technological arts, they are not limited to “a practical application of an abstract idea which produced a useful, concrete, and tangible result.” State Street Bank & Trust v. Signature Financial Group, Inc., 149 F. 3d 1368, 1375 n. 9 (Fed. Cir. 1998).

Specifically, claim 17 is directed to a system for decreasing data access time for an executing computer program comprising a database structure, a stream flow graph and a pre-fetcher. This system can be interpreted to be a system of software components, e.g., software program per se. Applicants thus fail to disclose that these

software components are tangibly embodied and executed by a piece of hardware and that their functions have practical applications which produce useful, concrete, and tangible results under the State Street Formulation.

On this basis, claim 17 is rejected under 35 U.S.C. § 101.

Claims 18-20, which depend from claim 17, respectively, are therefore rejected for the same reasons.

### *Double Patenting*

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Long*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1993); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Voge*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminated disclaimer in compliance with 37 CFR 1.103(c) 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Instant claims 1 and 10 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1+3, 9 and 13 of U.S. Patent Application No. 09/735,027.

09/735,027 (claim 1 + 3)	Instant Application (claim 1)
(a) reading a trace that describes data accesses performed by the computer program; (b) analyzing the trace to discover data access patterns;	identifying repetitively occurring data access sequences in the trace file
(c) building a grammar that represents repetitively occurring sequences of the data access patterns	using the identified sequences to create a modified trace file
removing stack references from the trace prior to building the grammar.	by removing less frequently occurring data access sequences from the trace file.

09/735,027 (claim 9)	Instant Application (claim 10)
(a) receiving a data access request;	receiving data access information from an executing program;
(b) using information about a data access sequence to determine if the data access request refers to part of a frequently occurring data access	identifying when the data access information is part of a frequently occurring data access pattern;

sequence;	
(c) if the data access request refers to part of the frequently occurring data access sequence, placing data from the data access request in a memory location	when the frequently occurring data access pattern follows another frequently occurring data access pattern, updating a data structure to reflect that the data access pattern follows the other data access pattern.

09/735,027 (claim 13)	Instant Application (claim 10)
(a) receiving a data access request	receiving data access information from an executing program
(b) using information about a data access sequence to determine if the data access request refers to an element of a frequently requested data access sequence.	identifying when the data access information is part of a frequently occurring data access pattern; when the frequently occurring data access pattern follows another frequently occurring data access pattern, updating a data structure to reflect that the data access pattern follows the other data access pattern.

Although the conflicting claims are not identical, they are not patentably distinct from each other because instant claims 1 and 10 appear to claim an obvious



variation of the invention claimed in claims 1+3, 9 and 13 of U.S. Patent Application No. 09/735,027.

13. Instant claim 1 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 13 of U.S. Patent Application No. 09/939,162.

09/939,162 (claim 13)	Instant Application (claim 1)
an instrumentation tool configured to instrument a software program to produce a trace when the software program is executed	
a trace analyzer configured to receive the trace and identify repetitively occurring data access sequences	identifying repetitively occurring data sequences in the trace file
a software development tool configured to use the identified data access sequences in software development	using the identified sequences to create a modified trace file by removing less frequently occurring data access sequences from the trace file

Although the conflicting claims are not identical, they are not patentably distinct from each other because instant claim 1 appears to claim an obvious variation of the invention recited in claim 13 of U.S. Patent Application No. 09/939,162.

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-22 are rejected under 35 U.S.C. § 102(b) as being anticipated by Larus, "Whole Program Path," May 1999.

### **Claim 1**

Larus discloses at least:

*identifying repetitively occurring data access sequences in the trace file* (see at least Abstract, 2<sup>nd</sup> paragraph; Introduction, 2<sup>nd</sup> paragraph; Overview, 1<sup>st</sup> paragraph);  
*using the identified sequences to create a modified trace file by removing less frequently occurring data access sequences from the trace file* (see at least Introduction, 2<sup>nd</sup> paragraph, e.g., "... identifying heavily executed paths and streamlining them into 'fast paths';" Overview, 1<sup>st</sup> paragraph, e.g., "... transforms the trace into a more compact and usable form by finding its inherent regularity (i.e., repeated code)).

### **Claim 2**

The rejection of base claim 1 is incorporated. Larus further discloses:

*constructing a grammar from the data accesses of the trace file* (see at least Figure 2 and related discussion in the article);

*building a candidate sequence using the grammar* (see at least Figure 2 and related discussion in the article); and

*if a cost of accessing data in the candidate sequence exceeds a threshold, marking the candidate sequence as a repetitively occurring data access sequence (see at least sections 4.1 and 4.2).*

### Claim 3

The rejection of base claim 1 and intervening claim 2 is incorporated. Larus further discloses *wherein computing the cost comprises multiplying a number of times the candidate sequence occurs in the grammar by a number of data accesses in the candidate sequence (see at least section 4.2, subpath's cost).*

### Claim 4

The rejection of base claim 1 is incorporated. Larus further discloses *using the identified data access sequences to update a stream flow graph that indicates how often each repetitively occurring data access pattern follows another repetitively occurring data access pattern (see at least Figure 2, WPP and related discussion in the article).*

### Claim 5

The rejection of base claim 1 is incorporated. Larus further discloses *wherein data accesses from the trace file are received as the computer program executes (see at least Figure 2 and related discussion in the specification).*

### Claim 6

The rejection of base claim 1 is incorporated. Larus further discloses *wherein the data access trace file is retrieved from a computer-readable medium (see at least section Performance).*

**Claim 7**

The rejection of base claim 1 is incorporated. Larus further discloses *wherein the modified trace file is further processed to compress data in it by steps, comprising identifying other sequences of repetitively occurring data access sequences in the modified trace file* (see at least Figures 1, 2, 7 and related discussion in the article); and *using the other sequences to create another trace by removing less frequently occurring data access sequences from the modified trace file* (see at least Figures 1, 2, 7 and related discussion in the article).

**Claim 8**

The rejection of base claim 1 and intervening claim 7 is incorporated. Larus further discloses *wherein the other trace is used to pre-fetch data* (see at least section 3.2, "looking ahead" feature of SEQUITUR(1)).

**Claim 9**

The rejection of base claim 1 and intervening claim 7 is incorporated. Larus further discloses *wherein the other trace is used in placing data in a cache* (see at least section 3.3, last two paragraphs).

**Claim 10**

Larus discloses at least:

*receiving data access information from an executing program* (see at least Figure 1, Path Profiling Tool; Figure 2; and related discussion in the article);  
*identifying when the data access information is part of a frequently occurring data access pattern* (see at least Figures 1, 2 and related discussion in the article);

*when the frequently occurring data access pattern follows another frequently occurring data access pattern, updating a data structure to reflect that the data access pattern follows the other data access pattern (see at least Figures 1, 2, 7 and related discussion in the article).*

**Claim 11**

The rejection of base claim 10 is incorporated. Larus further discloses *wherein the data access information is received on a computer upon which the executing program is executing* (see at least section 5).

**Claim 12**

The rejection of base claim 10 is incorporated. Larus further discloses *wherein the data access information is received on a computer other than a computer upon which the executing program is executing* (see at least section 5).

**Claim 13**

The rejection of base claim 10 is incorporated. Larus further discloses *wherein a grammar representing the data access information is used in identifying when the data access information is part of a frequently occurring data access pattern* (see at least section 3).

**Claim 14**

The rejection of base claim 10 is incorporated. Larus further discloses *wherein the data structure is a streamflow graph* (see at least Figure 2, WPP and related discussion in the article).

**Claim 15**

The rejection of base claim 10 and intervening claim 14 is incorporated. Larus further discloses *wherein the streamflow graph is used to pre-fetch data into memory* (see at least Figures 2, 7 and related discussion in the article).

**Claim 16**

The rejection of base claim 10 and intervening claims 14-15 is incorporated. Larus further discloses *wherein data is pre-fetched depending on the probability of the data being requested based on a current data access request* (see at least Figure 7 and related discussion in the article).

**Claim 17**

Larus discloses at least:

*a database structured to store data access information that includes data access sequences of the computer program* (see at least section 1, last paragraph and discussion related to WWP data structure in the article);

*a streamflow graph structured to store data that indicates a frequency that a data access sequence follows another data access sequence* (see at least Figure 2 and related discussion in the article); and

*a pre-fetcher configured to use the data access information and the streamflow graph to fetch data elements into memory for use by the executing computer program* (see at least section 3.2 and related discussion in the article).

**Claim 18**

The rejection of base claim 17 is incorporated. Larus further discloses *timing information that is used to determine when the data element should be retrieved* (see at least section 3.3).

**Claim 19**

The rejection of base claim 17 is incorporated. Larus further discloses *wherein during requests for data in one data access sequence, pre-fetching begins for data in another data access sequence that will follow* (see at least section 3.2).

**Claim 20**

The rejection of base claim 17 and intervening claim 19 is incorporated. Larus further discloses *wherein the other data access sequence follows when the one data access sequence dominates the other data access sequence* (see at least section 3.2).

**Claim 21**

Larus discloses at least:

*a database configured to store a stream flow graph* (see at least Figure 2, "Paths" and related discussion in the article);

*a database configured to store data access sequence information* (see at least Figure 2, "Acyclic Path Trace & "SEQUITUR Grammar"; and related discussion in the article); and

*a cache memory manager coupled to the stream flow graph database and the data access sequence database, wherein the cache memory manager is configured to arrange data elements of a repetitively accessed data stream in a cache using information from the two databases* (see at least Figure 2, "WPP" and related discussion in the article).

### Claim 22

The rejection of base claim 21 is incorporated. Larus further discloses *wherein the data elements of one repetitively accessed data stream are arranged in the cache to avoid a cache conflict* (see at least section 3.3).

### Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Antony Nguyen-Ba, whose telephone number is (703) 305-0103. The examiner can normally be reached on Tuesday - Friday from 6:15 – 3:45 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam, can be reached at (703) 305-4552.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Central Fax Number

(703) 872-9306



Art Unit 2122

May 27, 2004

**ANTONY NGUYEN-BA  
PRIMARY EXAMINER**